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**ABSTRACT OF THE DISCLOSURE**

The present invention provides an apparatus and method for enhancing the system response of a photodetector array based spectrometers. For a spectrometer with a given system response curve, secondary light sources are provided to improve the system response in the spectral ranges where the dynamic range is less than at the peak of the curve. In one embodiment, multiple light sources can be combined by means of multiple branches of fibre optic bundles. The secondary light sources may be used in combination with suitable shaping filters and/or masks to further flatten the system response.